Florida Gulf Coast University Board of Trustees
April 17, 2007

SUBJECT: New Degree Proposal: Bachelor of Science (B.S.) in Mathematics

PROPOSED BOARD ACTION
Approve new B.S. in Mathematics.

BACKGROUND INFORMATION
FGCU is requesting permission to offer a B.S. in Mathematics as described in the Executive Summary.

Supporting Documentation Included: (1) Memo from Provost, and (2) Executive Summary of Degree Program

Prepared by: Director of Program Development and Curriculum Cathy Duff

Legal Review by: N/A

Submitted by: Provost and Vice President for Academic Affairs Bonnie Yegidis
March 26, 2007

MEMORANDUM

TO: Trustee Larry Hart, Chair
    Academic/Student/Faculty Affairs Committee
    FGCU Board of Trustees

FROM: Bonnie F. Yegidis
    Provost and Vice President for Academic Affairs

SUBJECT: Bachelor of Science (B.S.) in Mathematics

The College of Arts and Sciences is proposing the addition of a B.S. in Mathematics. The proposed program builds upon the strengths of the existing degree programs offered through the college. The proposed B.S. complements the existing B.A. in Mathematics by providing a more intensive exposure to the technical aspects of the discipline. The B.S. will appeal to students who are candidates for graduate study in mathematics, science, or engineering, or who desire a more concentrated mathematics curriculum.

The B.S. in Mathematics will be 120 semester credit hours in length. It is consistent with the criteria for new degree authorization adopted by the Board of Governors on April 30, 2003. The proposed program has been approved by both the college curriculum team and the university-wide Undergraduate Curriculum Team.

Implementation of the B.S. in Mathematics program will provide Southwest Florida with a high quality program that is consistent with the university’s mission. I recommend approval.
FLORIDA GULF COAST UNIVERSITY

Executive Summary
New Program Proposal

Degree: Bachelor of Science (B.S.)
Major: Mathematics
Concentrations: None
College: Arts & Sciences
Department: Physical Sciences & Mathematics
Suggested CIP: 27.0101
Anticipated Implementation Date: Fall 2007

PROGRAM DESCRIPTION

Mathematics is essentially the general study of number and pattern. As a separate and self-contained discipline it has a rich history, worthy purpose, and noble esthetic. Linked to the sciences and related disciplines, it unlocks their potential to improve the human condition by providing a universal language to express conjecture, fact, and ultimately understanding. Practitioners of mathematics, not necessarily mathematicians but individuals operating at various levels of mathematical training in a host of professional endeavors, constitute a stock of intellectual capital that is enormously valuable to society. A mathematical education is unique in its focus on rigorous logic, analytical thinking, and problem-solving skill, all habits of mind which are prized in the practical world. The purpose of any mathematics program should ultimately be to add to society’s intellectual capital by nurturing the abilities of those students who have made the commitment to study mathematics, elevating each to a level of accomplishment that best fits their career aspirations and academic capacity.

The proposed B.S. in Mathematics will complement the existing Bachelor of Arts (B.A.) in Mathematics by providing a more intensive exposure to the technical aspects of the discipline. Specifically, the required number of credit hours for mathematics courses is increased to 45 for the former, compared to 37 for the latter. A differential of this magnitude in discipline-specific coursework between a B.S. and B.A. in Mathematics is typical for comparable programs among FGCU’s peer institutions. The B.A. degree will be preferred by students whose academic tastes lean towards the cluster of interdisciplinary studies courses featured in that program. The B.S. degree will appeal to those students who are candidates for graduate study in mathematics, science, or engineering, or who wish to trade some of the formal interdisciplinary content of the B.A. degree for a more concentrated mathematics curriculum. Mathematics majors both current and graduated have expressed a strong desire to see the mathematics program carry both degrees, and providing curriculum choices in this manner demonstrates a commitment to student-centered learning.
The proposed program will consist of 120 credit hours. The curriculum for the B.S. in Mathematics is an extension of that for the B.A. program, and as such carries over the balance between theory and application which was designed into the latter. On a more technical level, the curriculum gives balanced attention to the major sub-disciplines within mathematics, so that students will emerge from the program with a versatile background that is broad as well as deep. The overall tenor of the curriculum is based on the goal that graduates of the program will possess the level of competence and experience comparable to that delivered by the best mathematics programs in peer institutions.

CONSISTENCY WITH FGCU MISSION AND STRATEGIC PLAN

The University’s mission features undergraduate education using state-of-the-art pedagogical methods and technologies in an active, learning-centered environment. The strategic plan emphasizes active collaboration with community partners to benefit Southwest Florida. The proposed program is consistent with both the University mission and strategic plan. Lecture courses will utilize cutting edge presentation technologies and software support to deliver content in a classroom environment encouraging feedback and progress through inquiry. Discussion courses will establish an atmosphere of active learning and seek to build students’ confidence in expressing their competence. Faculty will support those students for whom an undergraduate research project is appropriate with technical guidance and overall mentoring.

NEED AND DEMAND FOR THE PROGRAM

The B.S. in Mathematics degree is not presently available from any institution in the five-county service area of FGCU. Mathematics degrees are projected (per the Degree Planning and Projection Model for the State University System Board of Governors dated November 18, 2004) to be awarded at an insufficient rate by 2013-2014 relative to the goals of the SUS Board of Governors’ 10-year strategic plan. Attracting students to the proposed program, who otherwise would not be considering a math major at an SUS school, would clearly act to reduce the projected deficit. In particular, it is reasonable to expect that local students, who wish to enter a mathematics program which offers more rigorous preparation for graduate study than the present B.A. degree, and who therefore may be looking to attend a school perhaps even outside the SUS, would represent a net credit towards the projected SUS degree deficit.

Unquestionably, there is a local shortfall of qualified high school mathematics teachers. The B.A. in Mathematics program at FGCU has historically channeled graduates into the Lee and Collier County school systems with good results. FGCU mathematics graduates can generally begin to teach immediately in the local schools, county or private, and catch up on certifications while on the job. Based upon available follow-up contacts with mathematics graduates, this is evidently the predominant career choice of our students. It is anticipated that the availability of the B.S. degree, and the additional choice it represents to academically strong students interested in a quantitative area of study, would cause a net increase in mathematics graduates over what might be expected if only the B.A. degree were on the books. There will no doubt be some initial shifting between programs (in both
directions), but the point remains that it is not expected to be a zero sum situation. More mathematics graduates translates into more candidates to enter the field of secondary school mathematics instruction, and this represents tangible support for the welfare of Southwest Florida.

ANTICIPATED ENROLLMENT

Projected enrollment for the B.S. in Mathematics program is summarized below:

<table>
<thead>
<tr>
<th>Year</th>
<th># Students</th>
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<tbody>
<tr>
<td>2007</td>
<td>30</td>
</tr>
<tr>
<td>2008</td>
<td>35</td>
</tr>
<tr>
<td>2009</td>
<td>40</td>
</tr>
<tr>
<td>2010</td>
<td>45</td>
</tr>
<tr>
<td>2011</td>
<td>50</td>
</tr>
</tbody>
</table>

This projection is based on past experience with the B.A. degree and consideration of the University’s present overall enrollment growth plan. As noted above, during the start-up years there will be some shifting of students from the B.A. to B.S. program, and perhaps some engineering students will switch to mathematics. Once the program attains maturity, and entering students benefit from initial advisement, it is envisioned that the B.S. program will attract, educate, and graduate students with only an occasional transfer from another program. In fact, due to the rigor of the program, it is more likely to lose students to the B.A. program, but this has already been discounted in the tabulated projection.

RESOURCE REQUIREMENTS

The marginal cost to the University of the B.S. in Mathematics program is expected to be nominal. It will require no new faculty, since roughly 75% of the courses required for the program are already being delivered in support the B.A. program, and the faculty FTE represented by the remaining 25% is a small fraction of the overall teaching load on the entire department.

The pedagogical infrastructure now on hand for the B.A. in Mathematics program will suffice for the proposed B.S. program. Mathematics requires no laboratory resources in the sense of chemistry or physics; however, the new program is intended to incorporate a substantial emphasis on computational software. Presently, the University has a site license for Maple, which is an advanced software package that will be adequate for the purposes of the curriculum. No additional library resources will be specifically required for this program, since the existing mathematics collection supporting the B.A. program will be adequate without modification.